

CLAIMS

What is claimed is:

1. A paper feeding apparatus of an image forming apparatus having a frame, a knock-up plate movably mounted on the frame, and a pickup roller, comprising:
a paper setting unit comprising,

a knock-up plate raising/lowering portion raising and lowering the knock-up plate with respect to the pickup roller,

a paper guide slidably formed on the knock-up plate to guide papers in accordance with a paper size, and

a finger device portion formed to be operated by the knock-up plate raising/lowering portion and the paper guide on both sides of the frame so as to press both corners of the leading end of one of the papers when the one paper is picked up by the pickup roller, thereby causing the papers to be separated and fed sheet by sheet.

2. The paper feeding apparatus of claim 1, wherein the finger device portion comprises:

a first finger portion formed on one side of the frame with respect to the knock-up plate raising/lowering portion to press one corner of the leading end of the one paper; and

a second finger portion formed on the other side of the frame with respect to the paper guide to press the other corner of the leading end of the one paper.

3. The paper feeding apparatus of claim 2, wherein the first finger portion comprises:

a first operating lever disposed on the frame to move toward or spaced away from the knock-up plate when the knock-up plate is raised or lowered by the knock-up plate raising/lowering portion; and

a first resilient returning member disposed between the frame and the first operating lever to return the operating lever towards the knock-up plate when the knock-up plate is raised by the knock-up plate raising/lowering portion.

4. The paper feeding apparatus of claim 3, wherein the first operating lever comprises:

a first hinge portion rotatably supported on the frame;

a first claw formed to press one corner of the leading end of the one paper; and
a first operating member formed in a vicinity of the first hinge portion to move the first lever member close to or away from the knock-up plate when the knock-up plate is raised or lowered by the knock-up plate raising/lowering portion.

5. The paper feeding apparatus of claim 3, wherein the first resilient returning member comprises:

a resilient spring arranged between the frame and the first operating lever.

6. The paper feeding apparatus of claim 2, wherein the second finger portion comprises:

a second operating lever disposed on the paper guide to be spaced away from the knock-up plate when the knock-up plate is spaced away from the pickup roller by a predetermined distance; and

a second resilient returning member disposed between the paper guide and the second operating lever to resiliently return the second operating lever towards the knock-up plate when the knock-up plate is raised to a vicinity of the pickup roller.

7. The paper feeding apparatus of claim 6, wherein the second operating lever comprises:

a second hinge portion hingedly supported on the paper guide;
a second claw formed to press the other corner of the leading end of the one paper; and
a second operating member formed in the vicinity of the second hinge portion to be spaced at a second predetermined distance from the frame so as to allow the second operating member to be positioned at a wider gap with the knock-up plate when the knock-up plate is spaced away from the pickup roller, the wider gap being widened by a distance by which the knock-up plate is spaced away from the pickup roller.

8. The paper feeding apparatus of claim 7, wherein the paper guide comprises a stopper portion, and the second predetermined distance between the frame and the second operating member is adjusted depending on a position of the stopper portion to restrict a movement of the second operating member by the second resilient returning member.

9. The paper feeding apparatus of claim 6, wherein the second resilient returning member comprises:

a tension spring secured between an end of the second operating member and the paper guide.

10. The paper feeding apparatus of claim 7, wherein the paper setting unit further comprise:

a finger raising/lowering device portion preventing the second finger portion from being blocked from further advancing by the other corner of the leading end of the one paper when the paper guide is moved to guide the papers with the knock-up plate being raised by the knock-up plate raising/lowering portion.

11. The paper feeding apparatus of claim 10, wherein the finger raising/lowering device portion comprises:

at least one operating rib formed on the frame with respect to the second operating member to raise the second operating member of the second operating lever against a recovering force of the second resilient returning member when the paper guide is drawn near to a side of the papers, and to cause the second operating member of the second operating lever to be pulled by the second resilient returning member so that the second claw contacts the papers with a predetermined pressure when the paper guide contacts the side of the papers.

12. The paper feeding apparatus of claim 11, wherein the operating rib comprises: two symmetrical inclined surfaces which are arranged in perpendicular relation with an advancing direction of the second operating member within a range of advancing movement of the second operating member, the inclined surfaces being inclined at a predetermined angle with respect to the advancing direction of the second operating member.

13. The paper feeding apparatus of claim 12, wherein the operating rib comprises: a plurality of operating sub-ribs arranged along the side of each type of the papers according to the paper size of the papers.

14. A paper feeding apparatus of an image forming apparatus having a frame and a knock-up plate, comprising:

a paper setting unit comprising,

a paper guide slidably formed on the knock-up plate to guide papers in accordance with a paper size, and

a finger portion formed to operate in combination with the paper guide so as to press at least a corner of the leading end of one of the papers positioned at a side of the paper guide.

15. The paper feeding apparatus of claim 14, wherein the finger portion comprises:

an operating lever disposed on the paper guide to be spaced away from the knock-up plate when the knock-up plate is spaced away from the pickup roller by a predetermined distance; and

a resilient returning member disposed between the paper guide and the second operating lever to resiliently return the second operating lever towards the knock-up plate when the knock-up plate is raised to a vicinity of the pickup roller.

16. A paper feeding apparatus of an image forming apparatus having a frame, a knock-up plate movably mounted on the frame, and a pickup roller picking up a sheet of paper disposed on the knock-up plate, comprising:

a paper setting unit comprising,

a knock-up plate raising/lowering portion raising and lowering the knock-up plate with respect to the pickup roller,

a first finger device disposed on the knock-up plate raising/lowering portion to contact a first end of the paper,

a paper guide slidably disposed on the knock-up plate to guide the sheet in accordance with a paper size, and

a second finger device portion movably disposed on the paper guide to contact a second end of the paper.

17. The paper feeding apparatus of claim 16, wherein the first finger device is disposed opposite to the second finger device with respect to the paper.

18. The paper feeding apparatus of claim 16, wherein the frame comprises a side on which the knock-up plate raising/lowering portion is rotatably disposed, and the paper guide moves toward or away from the side according to the size of the paper.

19. The paper feeding apparatus of claim 16, wherein the first finger device moves away from the paper when the knock-up plate raising/lowering portion moves with respect to the knock-up plate.

20. The paper feeding apparatus of claim 16, wherein the paper guide moves in a direction perpendicular to a paper feeding direction, and the second finger device moves together with the paper guide in the direction.

21. The paper feeding apparatus of claim 20, wherein the second finger device is moves away the paper when the second finger device moves together with the paper guide in the direction.

22. The paper feeding apparatus of claim 20, wherein the second finger device comes in contact with the second end of the paper when the second finger device and the paper guide stop moving in the direction.

23. The paper feeding apparatus of claim 12, wherein the paper moves in a feeding direction when being picked-up by the pickup roller, and the first and second ends of the paper are disposed opposite to each other with respect to the feeding direction.

24. A paper feeding apparatus of an image forming apparatus having a frame, a knock-up plate movably mounted on the frame, and a pickup roller picking up a sheet of paper disposed on the knock-up plate, the paper feeding apparatus comprising:

a first finger device movably disposed on a first portion of the knock-up plate to contact a first end of the paper; and

a second finger device movably disposed on a second portion of the knock-up plate to contact a second end of the paper.

25. The paper feeding apparatus of claim 24, wherein the first and second finger devices move independently from each other.

26. The paper feeding apparatus of claim 24, wherein the knock-up plate comprises first and second sides disposed opposite to each other with respect to a paper feeding direction.

27. The paper feeding apparatus of claim 24, further comprising:
a knock-up plate raising/lowering portion moving with respect to the frame to raise and lower the knock-up plate with respect to the pickup roller.
28. The paper feeding apparatus of claim 27, wherein the first finger device moves according to a movement of the knock-up plate raising/lowering portion.
29. The paper feeding apparatus of claim 27, further comprising:
a paper guide slidably disposed on the knock-up plate to move toward and away from the knock-up plate raising/lowering portion according to a size of the paper disposed between the paper guide and a side of the knock-up plate.
30. The paper feeding apparatus of claim 29, wherein the knock-up plate raising/lowering portion moves in a first direction, and the paper guide moves in a second direction perpendicular to the first direction.
31. The paper feeding apparatus of claim 30, wherein the first finger device moves in the first direction, and the second finger device moves in the first and second directions.